AD-A211 658

DTIC ACCESSION NUMBER

DTIC FILE COPY

PHOTOGRAPH THIS SHEET

LEVEL

1

INVENTORY

R 87-1865

DOCUMENT IDENTIFICATION

APRIL 1987

This document has been approved for public release and sale; its distribution is unlimited.

DISTRIBUTION STATEMENT

ACCESSION FOR	
NTIS GRA&I	X
DTIC TAB	
UNANNOUNCED	
JUSTIFICATION	
BY	
DISTRIBUTION /	
AVAILABILITY CODES	
DIST	AVAIL AND/OR SPECIAL
A-1	

DISTRIBUTION STAMP

DTIC
ELECTE
AUG 23 1989
S D

DATE ACCESSIONED

DATE RETURNED

89 8 22 025

DATE RECEIVED IN DTIC

REGISTERED OR CERTIFIED NO.

PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-FDAC

DTIC FORM 70A MAR 86

DOCUMENT PROCESSING SHEET

PREVIOUS EDITION MAY BE USED UNTIL STOCK IS EXHAUSTED.

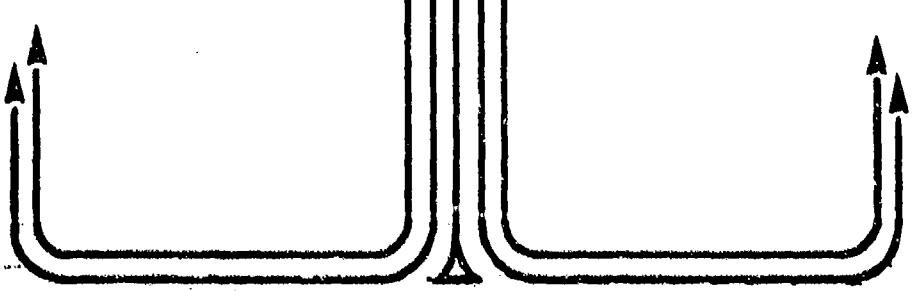
AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

THE EFFECT OF COMMUNITY COLLEGE OF THE AIR FORCE PARTICIPATION ON ENLISTED PROMOTIONS IN SELECTED CAREER FIELDS

MAJOR GREGORY J. NIEMIEC 87-1865

"insights into tomorrow"



PAGES _____

ARE

MISSING

IN

ORIGINAL

DOCUMENT

DISCLAIMER

The views and conclusions expressed in this document are those of the author. They are not intended and should not be thought to represent official ideas, attitudes, or policies of any agency of the United States Government. The author has not had special access to official information or ideas and has employed only open-source material available to any writer on this subject.

This document is the property of the United States Government. It is available for distribution to the general public. A loan copy of the document may be obtained from the Air University Interlibrary Loan Service (AUL/LDEX, Maxwell AFB, Alabama, 36112) or the Defense Technical Information Center. Request must include the author's name and complete title of the study.

This document may be reproduced for use in other research reports or educational pursuits contingent upon the following stipulations:

-- Reproduction rights do not extend to any copyrighted material that may be contained in the research report.

-- All reproduced copies must contain the following credit line: "Reprinted by permission of the Air Command and Staff College."

-- All reproduced copies must contain the name(s) of the report's author(s).

-- If format modification is necessary to better serve the user's needs, adjustments may be made to this report--this authorization does not extend to copyrighted information or material. The following statement must accompany the modified document: "Adapted from Air Command and Staff Research Report (number) entitled (title) by (author) ."

-- This notice must be included with any reproduced or adapted portions of this document.

REPORT NUMBER 87-1865

TITLE THE EFFECT OF COMMUNITY COLLEGE OF THE AIR FORCE PARTICIPATION ON ENLISTED PROMOTIONS IN SELECTED CAREER FIELDS

AUTHOR(S) MAJOR GREGORY J. NIEMIEC, USAF

FACULTY ADVISOR DOCTOR GLEN L. SPIVEY, ACSC/CAE

SPONSOR COLONEL RODNEY V. COX JR., CCAF/CC

Submitted to the faculty in partial fulfillment of requirements for graduation.

AIR COMMAND AND STAFF COLLEGE
AIR UNIVERSITY
MAXWELL AFB, AL 36112

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT STATEMENT "A" Approved for public release; Distribution is unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) 87-1865	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION ACSC/EDCC 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State and ZIP Code) Maxwell AFB, AL 36112-5542	7b. ADDRESS (City, State and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State and ZIP Code)	10. SOURCE OF FUNDING NOS. PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT NO.
11. TITLE (Include Security Classification) THE EFFECT OF COMMUNITY COLLEGE	
12. PERSONAL AUTHOR(S) Niemiec, Gregory J., Major, USAF	
13a. TYPE OF REPORT 13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Yr., Mo., Day) 1987 April 15. PAGE COUNT
16. SUPPLEMENTARY NOTATION ITEM 11: OF THE AIR FORCE PARTICIPATION ON ENLISTED PROMOTIONS IN SELECTED CAREER FIELDS (U)	
17. COSATI CODES FIELD / GROUP / SUB. GR.	18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The research attempted to evaluate the effectiveness of Community College of the Air Force (CCAF) curriculum programs in selected AFSCs. The research replicates and expands a prior study on technical sergeants, ACSC Student Report Number 86-1310, by Major Donny R. Jones. The relationship between early promotion to master sergeant and CCAF participation was studied with the result that a significant association was found in selected AFSCs. That indicated the CCAF curriculum for those AFSCs may be effective. Major Jones' study results were basically confirmed with some differences in the strength of association between early promotion and CCAF participation, i.e., master sergeants were less inclined to have this association than technical sergeants.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☒ DTIC USERS ☐	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL ACSC/EDCC Maxwell AFB, AL 36112-5542	22b. TELEPHONE NUMBER (Include Area Code) (205) 293-2483 22c. OFFICE SYMBOL

DD FORM 1473, 83 APR EDITION OF 1 JAN 73 IS OBSOLETE.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

PREFACE

The research attempted to evaluate the effectiveness of Community College of the Air Force (CCAF) curriculum programs in selected AFSCs. The research replicates and expands a prior study on technical sergeants, ACSC Student Report Number 86-1310, by Major Donny R. Jones. The relationship between early promotion to master sergeant and CCAF participation was studied with the result that a significant association was found in selected AFSCs. That indicated the CCAF curriculum for those AFSCs may be effective. Major Jones' study results were basically confirmed with some differences in the strength of association between early promotion and CCAF participation, i.e., master sergeants were less inclined to have this association than technical sergeants.

The author wishes to thank several individuals whose assistance was invaluable in successfully completing this research project. The first is Dr. Ray Lewiski, Personnel Research Psychologist at the Community College of the Air Force. He was instrumental in accessing the Atlas data and provided many insights, especially in the statistical areas. The assistance provided by Captain Dave Stamper, also from CCAF, in performing the data testing with the Zenith 248 computer is greatly appreciated. Next, a thank you to Dr. Glenn Spivey for his expert guidance as project advisor. Finally, the author is indebted to Mary Anne Niemiec for her hard work and dedication in editing and typing this project.

ABOUT THE AUTHOR

Major Niemiec graduated from the University of Detroit in 1973 with a BA in Psychology and an AFROTC commission.

His first assignment was as a Minuteman III missile launch officer at FE Warren AFB, Wyoming. He served on a combat crew both as deputy and commander. In 1976, he received an MA in Psychology, Guidance and Counseling from the University of Northern Colorado.

He was then selected to attend the Air Force Institute of Technology at Wright-Patterson AFB, Ohio. In 1979, he graduated with an MS in Logistics Management and received the Wall Street Journal Award for academic excellence.

He completed Missile Maintenance Training and served at Minot AFB, North Dakota in several staff and squadron positions. In 1983, he was selected as a member of the initial cadre for the first Ground Launched Cruise Missile Wing at RAF Greenham Common, United Kingdom. While there, he was named the Outstanding Missile Maintenance Field Grade Officer of 1985 for the United States Air Forces in Europe (USAFE).

Major Niemiec has completed both Squadron Officer School and Air Command And Staff College. His next assignment will be with USAFE Headquarters in Missile Maintenance (HQ USAFE/LGM) at Ramstein AB, Germany.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

TABLES

EXECUTIVE SUMMARY

Part of our College mission is distribution of the students' problem solving products to DoD sponsors and other interested agencies to enhance insight into contemporary, defense related issues. While the College has accepted this product as meeting academic requirements for graduation, the views and opinions expressed or implied are solely those of the author and should not be construed as carrying official sanction.

"insights into tomorrow"

REPORT NUMBER 87-1865

AUTHOR(S) MAJOR GREGORY J. NIEMIEC, USAF

TITLE THE EFFECT OF COMMUNITY COLLEGE OF THE AIR FORCE PARTICIPATION ON ENLISTED PROMOTIONS IN SELECTED CAREER FIELDS

I. Purpose: The Community College of the Air Force plays an important role in the development of the USAF enlisted force. An earlier ACSC research study, 86-1310 by Major Jones, concluded that early versus late promotions may be a measure of CCAF curriculum effectiveness. This study attempted to replicate and expand that study and thus add to the knowledge base concerning effectiveness of CCAF education.

II. Problem: The research hypothesis tested was "NCOs in selected AFSCs who participate in CCAF are more likely to be promoted early to master sergeant than late."

III. Data: Master sergeants who were promoted in 1986 in ten Air Force Specialty Codes were the sample used in the study. These AFSCs represented all five CCAF general program areas. This expanded Jones' study which concentrated on aircraft maintenance AFSCs only. The data was gathered from the Air Force Master Personnel Records using the Atlas Inquiry Language. After collection, it was then grouped into an early versus late promotion category and then further grouped according to levels of CCAF participation.

Keywords: Air Force personnel, Enlisted personnel, Promotion (Advancement), Careers, Noncommissioned officers (SDN)

CONTINUED

A Chi-Square test was utilized with significance at the .01 level and then a contingency coefficient was used to determine strength of relationship. Results were analyzed and compared with Jones' study.

IV. Conclusions: The conclusions and findings verified the research hypotheses. Most AFSCs showed some strong association between CCAF participation and early promotion. There was also some conflict with Jones' study in the results in that the strength of association was not as great for master sergeants as for technical sergeants. Two possible explanations were offered. First, more intervening variables may be present for master sergeants which reduce the association between CCAF participation and early promotions. The other explanation was that perhaps a better measure of CCAF curriculum effectiveness for master sergeants and above may be promotion versus nonpromotion.

V. Recommendations: It was recommended that CCAF use the early versus late promotion association with CCAF participation as a flagging technique to point out possible weak curriculum areas. Several further areas for study were also recommended.

Chapter One

INTRODUCTION

Background

The Community College o the Air Force (CCAF) has a vital role to play in keeping the United States Air Force (USAF) strong and viable. Air Force weapons and weapon systems have become more and more complicated due to technological advances. One way to cope with these developments is to have more highly educated enlisted personnel. These are the individuals who maintain, and in many cases operate, these advanced systems.

CCAF plays an important role in this education process. Specifically, it offers an Associate in Applied Science Degree in high technology areas related to each airman's Air Force Specialty Code (AFSC) (9:1). But how effective are these programs in meeting the missions and goals of the college? This question forms the basis for this study.

Significance of the Problem

Evaluation of CCAF curriculum effectiveness could benefit both the USAF and the CCAF students.

Just how important is this evaluation process to a college? Extremely important, according to the Southern Association of Colleges and Schools, of which CCAF is an accredited member (9:1). The Association calls this "Institutional Effectiveness" and defines it as "the quality of education provided by member institutions." They further state that this "is the primary consideration in the decision to confer or reaffirm accreditation" (11:9).

There are three critical steps in the evaluation process designed to assess the effectiveness of curriculum programs. First, the purpose or mission of the institution must be established (11:9). The stated purpose of CCAF is to "offer Air Force enlisted personnel educational opportunities which will provide for increased occupational competence, and for personal recognition within the Air Force as evidenced by promotions . . . "(9:1,2).

Next, the purpose must be translated into goals which the school must reach to fulfill its purpose. One of the goals of the school is to "contribute to the development of Noncommissioned Officers for their role of leadership within the increasingly sophisticated and complex technology of the Air Force" (9:2). Thus the Air Force considers it very important that this education enhance and develop the skills and knowledge necessary to improve the leadership potential of future NCOs.

Once the purpose and goals are known, the third step in the process of evaluating curriculum effectiveness is to measure achievement of these goals. The quality of education provided can then be evaluated and changes made to the curriculum when necessary (11:9). This process results in the most effective way of meeting the needs of both the Air Force and the students.

Assumption

Following this curriculum evaluation process, the purpose and goals of the Community College of the Air Force are examined. One of the ways to measure whether or not the college is contributing to the development of NCOs for their role of future leadership is promotion. If CCAF enhances the usefulness of its students to the Air Force, this should be reflected in increased opportunity for promotion of CCAF students, and they should be promoted ahead of their peers. Therefore, if CCAF students were not promoted earlier in specific AFSCs, this may be used as a flagging technique for further evaluation and possible curriculum changes.

Previous Study

An initial study in this area, entitled "Preparing Today's Maintenance NCO to be a Senior NCO in the 1990s," was accomplished by Major Donny R. Jones, an ACSC student. The study "identified ways in which CCAF educational programs enhance promotion opportunities as well as Senior NCOs' contribution to the Air Force" (10:ii). He concluded that in the six aircraft maintenance related AFSCs covered in his study, there is "a significant relationship between early promotions and being registered with CCAF" (10:ii). Major Jones further recommended the accomplishment of additional studies to see if his findings could be applied to other specialty fields (AFSCs) since each has its own tailored academic program (10:39).

Objective

Therefore, the objective of this study is to replicate and expand Major Jones' study using different selected AFSCs covering each of the five general areas of the CCAF Associate Degree Program. For this purpose, the following research hypothesis is used: NCOs in selected AFSCs who participate in CCAF are more likely to be promoted early to master sergeant than late.

Chapter Two

THE DATA BASE

This chapter will describe the data selected for use in the study and the reason for selection.

Atlas System

The Atlas Inquiry Language and Atlas System accesses the Air Force Military Master Personnel Records at the Air Force Manpower and Personnel Center (8:3-1). Data requirements were input using the Community College of the Air Force Atlas interface terminal located at Maxwell AFB, Alabama.

Air Force Specialty Code

In Jones' study, six AFSCs were selected. All were associated with aircraft maintenance and included the following: 32XXX, 39XXX, 40XXX, 42XXX, 43XXX and 46XXX (10:16). These AFSCs represented four of the five general program areas in which the CCAF awards degrees. These areas included Aircraft and Missile Maintenance, Electronics and Telecommunications, Management and Logistics, and Public and Support Services. The only general program area not represented in the study was the Health Care Sciences. However, in the current study, ten AFSCs were selected for examination. The selected AFSCs were chosen to fulfill two purposes. First, to help replicate Jones' study. This included selecting two AFSCs (32XXX and 46XXX) specifically used in Jones' study and six other AFSCs which covered the same four general program areas. Second, to expand his study, eight of the ten AFSCs selected were not previously studied. Additionally, these represent all general program areas and include two AFSCs (90XXX and 98XXX) in the Health Care Sciences general program area. Following discussion with Dr. Ray Lewiski, CCAF Personnel Research Psychologist, the AFSCs in Table 1 were selected.

#	AFSC	GENERAL PROGRAM AREA PRIMARILY COVERED
1	*32XXX	Electronics and Telecommunications
2	41XXX	Electronics and Telecommunications Aircraft and Missile Maintenance
3	*46XXX	Aircraft and Missile Maintenance
4	47XXX	Public and Support Services
5	49XXX	Management and Logistics
6	64XXX	Management and Logistics
7	70XXX	Management and Logistics
8	81XXX	Public and Support Services
9	90XXX	Health Care Sciences
10	98XXX	Health Care Sciences

* Previously studied by Jones

Table 1. AFSCs/General Program Area (9:11-14)

Rank

Major Jones studied those in his selected AFSCs who were promoted to technical sergeant in 1985. Technical sergeants were studied "primarily because the TSgts selected in 1985 will be the Senior NCOs of the 1990s" (10:13). To further expand the knowledge to be gained by the CCAF, master sergeants were the rank chosen for this study. Choosing only one rank limits the field of study to manageable proportions in accordance with the ACSC research guidance (7:1-3). Additionally, using only those selected for master sergeant in 1986 made the sample data the most current available.

Data

Data requested on each individual studied were Social Security Number (SSAN), Total Active Federal Military Service Date (TAFMSD) (for determining early versus late promotion) and CCAF status (for determining involvement of each individual in the CCAF program). The ATLAS system provided data as per Table 2.

SSAN	PAFSC	TAFMSD	CCAF
123456789	32172	690406	2

Table 2. ATLAS Inquiry Data Example

The example demonstrates an Avionic Weapon Delivery System master sergeant who was promoted in 1986. The sergeant entered service in 1969 and is currently in CCAF advanced status with more than 45 semester hours completed. Table 3 explains the CCAF status categories.

CODE	CCAF STATUS
Blank	Not registered
A	CCAF diploma conferred
B	Two CCAF diplomas conferred
1	Registered - up to 45 semester hours - no degree
2	Advanced standing - 45+ semester hours - no degree
3	First degree awarded
4	CCAF degree plus registered up to 45 sem hrs
5	CCAF degree plus advanced standing - 45+ sem hrs
6	Second degree awarded

Table 3. CCAF Status Category (8:Data Tabie 650)

The number of individual data sets totaled 3,491. Once the data was received, data manipulation and analysis began.

Chapter Three

METHODOLOGY

The method of data manipulation and analysis is explained in this chapter. First, the data was grouped according to early versus late promotions to master sergeant.

Early Versus Late Promotions

This was accomplished in the following manner. The average total active federal military service date was calculated for the entire sample and then for each AFSC. Results are in Table 4.

AFSC	TAFMSD RANGE	MEAN	AVERAGE TAFMSD	AVERAGE YEARS TO MASTER SERGEANT
32XXX	64-77	70.10	1970	15.90
41XXX	65-76	70.69	1971	15.31
46XXX	64-78	71.05	1971	14.95
47XXX	64-76	69.29	1969	16.71
49XXX	62-77	69.79	1970	16.21
64XXX	63-77	70.23	1970	15.77
70XXX	64-77	69.93	1970	16.07
81XXX	64-78	70.79	1971	15.21
90XXX	63-78	70.22	1970	15.78
98XXX	66-76	70.10	1970	15.90
Total	62-78	70.27	1970	15.73

Table 4. Average TAFMSD

The average TAFMSD for the total sample was 1970.27 (or 15.73 years to promotion to master sergeant). However, the variations within each AFSC varied by almost a year in either direction. Therefore, when determining early versus late promotion categories, the average TAFMSD in each AFSC was used, not the total sample average.

Next, the average TAFMSDs were used to separate the samples into those promoted early versus late. For example, the average TAFMSD for all 32XXX personnel was 70.10 rounded to 1970. All 32XXX personnel with a TAFMSD in 1970 were not used during testing since they were promoted "on time". Those with a TAFMSD of 1969 and earlier were placed in the promoted late category. Those with a TAFMSD of 1971 and later were placed in the promoted early category. Once the early versus late categories were established, those within each category were further separated by degree of participation in the Community College of the Air Force.

CCAF Participation

There were three groupings selected to describe participation in CCAF. These were selected for two reasons. The first was to better define CCAF participation. The second was to test whether certain degrees of participation made a difference in early versus late promotions. Further definition of these groupings follow.

Registered Versus Not Registered. This compares those who were CCAF registered versus those who were not registered. Registered is defined as those personnel who are currently enrolled or possess a CCAF degree. This grouping was also used in Jones' study and found to have a significant association with early versus late promotions (10:37). By testing this grouping it can be determined if participation in any aspect of CCAF will have an association with early promotions to master sergeant. Table 5 shows the Atlas codes used for this grouping.

CATEGORY	CODES
CCAF Registered	A,B,1,2,3,4,5,6
CCAF Not Registered	No Entry

Table 5. CCAF Registered Grouping Codes

Advanced Status Versus Not Advanced. This grouping compares those who have completed more than 45 semester hours or are CCAF degree holders versus those not enrolled or enrolled with 45 or less semester

hours. This was not studied by Jones. If advanced status was associated with earlier promotions, this could signify that CCAF programs are possible players in the accomplishment of the college's purpose and goals. To be included in Advanced Status, personnel must be further than those recently enrolled. They must have taken and passed several college courses. This could be the most important grouping. Table 6 shows the Atlas codes used for this grouping.

CATEGORY	CODES
Advanced Status	A,B,2,3,4,5,6
Not Advanced Status	1, No Entry

Table 6. Advanced Status Grouping Codes

Degree Versus No Degree. This tests the comparison between those with a minimum of an associate degree and those without any degree. This grouping was also used in the Jones study (10:37). The purpose is to see what significance, if any, a CCAF degree alone has on being promoted early. Table 7 shows the Atlas codes used for this grouping.

CATEGORY	CODES
CCAF Degree	A,B,3,4,5,6
No Degree	1,2, No Entry

Table 7. CCAF Degree Grouping Codes

After all the data was grouped, categorized and placed into cells, testing was accomplished. The tests selected were the Chi-square and the contingency coefficient.

Chi-Square

The Chi-square test is particularly useful with grouped data. This is called nominal scaling and can be defined as "assigning observations to well defined, mutually exclusive categories" (5:112).

Additionally, the Chi-Square test is used when the study is "interested in comparing categories among themselves" (5:112) and gives a "goodness-of-fit statistic" (6:503). The test assumes the data in each category (cells) are independent and compares this assumption with the number of observations that actually occur in each cell. From these comparisons the Chi-square statistic is calculated. Using this statistic and a Chi-square significance table the probability of the result due to chance can be determined (6:501-510).

To find the significance of the test, the number of degrees of freedom must first be calculated as follows: (number of rows - 1) times (number of columns - 1) = degrees of freedom (2:500). Since our Chi-square contingency table has 4 cells, 2 rows and 2 columns, the degree of freedom is one. (See Table 8.)

	REGISTERED CCAF	NOT REGISTERED
EARLY PROMOTION	a	b
LATE PROMOTION	c	d

Table 8. Chi-Square Contingency Table Example

Significance. By reviewing the Chi-square probability table, it can be determined that a Chi-square statistic of 6.6349 or higher will be significant at the .01 probability level and one of 3.84146 or higher will be significant at the .05 level (2:A9). This allows rejection of the null hypothesis which states that being promoted early or late is independent of having participated in a CCAF program. After an association has been established, one must look at the data to determine if it is a positive association (for example, earlier promotion associated with CCAF participation) since the Chi-square only indicates that there is significant association.

Limitations. There are some limitations in using the Chi-square test. First, only associations, not cause and effect, are possible to predict. Second, the frequency in any cell should not be less than five with one degree of freedom and .01 level of significance or the test results will be too inexact to be useful (3:300,301). Finally, with a large sample, significance is almost assured as "small deviations from the null hypothesis can be detected as statistically significant" (4:28). Since one can argue that most large samples will contain some deviation from the "norm", findings of significance may or may not be important in the association.

The first limitation must be remembered when drawing conclusions and making recommendations. Using the test results as a flagging technique for a possible ineffective curriculum rather than saying the curriculum is effective or ineffective takes the first limitation into account. To accomodate the second limitation, it was determined that the test results would not be used if cells did not contain at least five observations. Finally, the contingency coefficient can solve the last limitation of possible, automatic, large, sample significance.

Contingency Coefficient

The contingency coefficient is a way of judging the strength of any Chi-square association (1:234). It's a method of determining practical significance by measuring if the variable of CCAF participation is accounting for enough of the association with early versus late promotion to be useful. If determined not useful, other variables may be affecting this association as well, for example, reading ability or test taking aptitude. In a 2x2 contingency table the lowest coefficient possible is 0, the highest is .707 (1:235,236). Based on this, a review of the Jones' study and consultation with Dr. Ray Lewiski, a contingency coefficient of .20 or greater was considered sufficient to show the strength of the association. This, coupled with .01 significance, would result in acceptance of the research hypothesis.

The tests were run on a CCAF Zenith 248 computer using the Epistat Chi-square statistical program. Results are analyzed in chapter 4.

Chapter Four

ANALYSIS OF DATA

Results obtained from the testing of data using the Chi-square and contingency coefficient tests will be analyzed and discussed in this chapter. To reiterate, a Chi-square test with a resulting statistic of 6.63 or higher demonstrates significance at the .01 level. A contingency coefficient of .20 or greater demonstrates the practical strength of the association. Significance in either test will be indicated in the results tables with an asterisk. If significance is found, then a look at the data will determine whether the association between being promoted early and CCAF participation is a positive one. The early versus late promotees are arrayed against the three CCAF groupings used in the study: CCAF Registered versus Not Registered, Advanced Status versus Not Advanced, and CCAF Degree versus No Degree. Results of tests follow with the total sample (all AFSCs) listed first and then each AFSC listed separately.

Total Sample Results

These are the most important results and will form a mainstay of the conclusions drawn from the study. The ten AFSCs studied totaled 3,491 personnel. Results are listed in Table 9.

	CCAF REG	NOT REG	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	1295	175	583	887	301	1169
LATE	1108	423	339	1192	152	1379
CHI-SQR	115.23 *		107.30 *		64.28 *	
CONT COEF	.19		.19		.14	

Table 9. Results for Total Sample

All three Chi-square statistics are significant. The Chi-square for CCAF Registered and Advanced Status groupings are particularly

impressive: 115.23 and 107.30 respectively versus 6.63 required for .01 significance. A review of the data indicates a positive relationship between CCAF participation in all groupings and early promotion. However, the contingency coefficient does not demonstrate a strong enough relationship, though the coefficient is very close to .20, for CCAF Registered and Advanced Status. This indicates that even though there is a significant association it's practical usefulness is probably limited due to other factors which may affect this association besides just CCAF participation. Because none of the coefficients were strong, CCAF participation should not be used alone as a predictor of early promotion for master sergeants in general. Next, the individual AFSCs will be analyzed.

Individual AFSC Results

32XXX Results. The 32XXX career field, Avionics Systems, consisted of a sample of 533 personnel. Results are listed in Table 10.

	CCAF REG	NOT REG	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	210	27	125	112	45	192
LATE	179	55	92	142	38	196
CHI-SQR	11.19 *		8.01 *		.44	
CONT COEF	.15		.13		.03	

Table 10. Results for AFSC 32XXX

Only the CCAF Registered and Advanced Status groupings were significant. However, the low contingency coefficients indicate a weak strength of relationship. The very low CCAF Degree Chi-square statistic and a review of the data indicate that about the same number of personnel in both the early and late categories have received their CCAF degree.

41XXX Results. The 41XXX career field, Missile Systems Maintenance, was comprised of 121 individuals. The results in two of the groupings, CCAF Registered and CCAF Degree, were rejected since one cell in each contained less than five observations.

	ADV STAT	NOT ADV
EARLY	24	21
LATE	13	38
CHI-SQR	6.69 *	
CONT COEF	.26 *	

Table 11. Results for AFSC 41XXX

The Advanced Status was significant for both association and practical strength of relationship. Advanced CCAF Status can be a predictor of early promotion potential for the Missile Systems Maintenance career field.

46XXX Results. The 46XXX career field, Munitions, Weapons Maintenance and Explosive Ordinance Disposal, contained 411 personnel in the sample. Results are in Table 12.

	CCAF REG	NOT REG	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	167	17	76	108	33	151
LATE	120	33	41	112	13	140
CHI-SQR	9.10 *		7.13 *		5.54	
CONT COEF	.16		.14		.13	

Table 12. Results for AFSC 46XXX

Both CCAF Registered and Advanced Status statistics were significant in explaining early promotion. However the strength of the relationship is low and should not be used as a predictor. CCAF Degree showed significance at the .05 level but was not significant for this study.

47XXX Results. The 47XXX career field, Vehicle Maintenance, was the second smallest sample with 86 personnel. Only one grouping could be tested because of low cell counts in the other two groupings.

	CCAF REG	NOT REG
EARLY	29	7
LATE	21	12
CHI-SQR	1.69	
CONT COEF	.15	

Table 13. Results for AFSC 47XXX

CCAF Registered was not significant. A review of the data shows that the majority of both early and late promotees were registered. More early promotees were registered proportionally than late promotees, but the sample numbers were just too small to be significant.

49XXX Results. The 49XXX career field, Information Systems, totaled 471 personnel.

	CCAF REG	NOT REG	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	171	18	81	108	48	141
LATE	173	63	73	163	37	199
CHI-SQR	18.96 *		5.95		5.60	
CONT COEF	.21 *		.12		.12	

Table 14. Results for AFSC 49XXX

CCAF Registered was both significant and demonstrated a strong association or relationship. There were very few unregistered early promotees. Both Advanced Status and CCAF Degree were significant only at the .05 level, and the contingency coefficient was not strong enough to be useful.

64XXX Results. The 64XXX personnel in the Supply career field showed one of the strongest associations. There were 489 in this study.

	CCAF REG	NOT REG	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	178	35	73	140	37	176
LATE	134	77	24	187	8	203
CHI-SQR	20.93 *		30.21 *		19.20 *	
CONT COEF	.22 *		.26 *		.21 *	

Table 15. Results for AFSC 64XXX

This was the only AFSC which demonstrated significance of association and strong relationships in all three groupings. A review of the data shows every measured facet of participation in CCAF to be associated with early promotion in the Supply career field.

70XXX Results. The 70XXX career field, Administration, totaled 565 personnel in the sample. Results of testing are contained in Table 16.

	CCAF REG	NOT REG	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	203	40	74	169	36	207
LATE	172	89	34	227	14	247
CHI-SQR	19.64 *		21.67 *		11.54 *	
CONT COEF	.19		.20 *		.15	

Table 16. Results for AFSC 70XXX

Advanced Status was both significant and a practical predictor of early promotion. Both CCAF Registered and CCAF Degree were significant only in the Chi-square statistic with the relationship being fairly strong in the registered grouping but weaker for the degree grouping. Neither was of practical use.

81XXX Results. The 81XXX career field, Security Police, was comprised of 502 personnel. This career field demonstrated some strong associations.

	CCAF REG	NOT REG	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	167	18	64	121	46	139
LATE	166	48	32	182	17	197
CHI-SQR	10.69 *		19.89 *		20.11 *	
CONT COEF	.16		.22 *		.22 *	

Table 17. Results for AFSC 81XXX

Both Advanced Status and CCAF Degree were significantly and strongly related to early promotion to master sergeant in Security Police. A review of the data indicates a positive relationship between CCAF participation and early promotion in these groupings. CCAF Registered was also significant but a weak relationship is indicated.

90XXX Results. The 90XXX Medical career field had 253 individuals in the sample. Two strong associations are reported.

	CCAF REG	NOT REG	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	103	8	48	63	31	80
LATE	86	26	22	90	14	98
CHI-SQR	9.85 *		13.34 *		7.31 *	
CONT COEF	.21 *		.24 *		.18	

Table 18. Results for AFSC 90XXX

CCAF Registered and Advanced Status were both significant and strongly associated. Either category would make a good predictor of early promotion as a data review shows CCAF participation is related to early promotion. CCAF Degree is also significant but not as strongly associated as the other two groupings.

98XXX Results. The 98XXX Dental career field is the smallest of the samples with only 60 personnel. As a result, the CCAF Registered grouping was not tested since one cell had less than five observations.

	ADV STAT	NOT ADV	CCAF DEGREE	NO DEGREE
EARLY	12	15	7	20
LATE	6	20	5	21
CHI-SQR	1.83		.01	
CONT COEF	.18		.01	

Table 19. Results for AFSC 98XXX

Neither Advanced Status nor CCAF Degree was significant or had strong relationships. In fact, CCAF Degree for the 98XXX career field had the lowest Chi-square statistic and contingency coefficient of any grouping. These results are in part due to the extremely small sample size and even numbers of early and late promotees participating in CCAF programs.

Summary

An analysis of all samples using the Chi-square and contingency coefficient was accomplished. The data was grouped into early versus late promotions. These were then further subgrouped into three CCAF participation categories, CCAF Registered versus Not Registered, Advanced Status versus Not Advanced and CCAF Degree versus No Degree.

Problems with small sample size in individual cells resulted in 5 of the 33 results being discarded. For all significant relationships a review of the data was accomplished, and in each case a positive relationship between CCAF and early promotion was evident. Ten grouping results proved both significant and strong in this relationship. Another eleven were significant but not strong enough to meet the .20 coefficient cutoff as good practical predictors. Four of these did have a coefficient of .18 or better, however. An additional three had significance at the .05 level (below the cutoff of .01) but low strength of relationship. Finally, only four demonstrated no significance or strength relationship, and three of these were in the two groups (98XXX and 47XXX) containing the smallest sample sizes. The next chapter will discuss the conclusions drawn from the analysis of this data.

Chapter Five

CONCLUSIONS

This chapter will discuss the analysis of the tests results, drawing conclusions (statements of fact) and findings (statements of belief) (7:62). First, a summary of the test results will be printed. Next, conclusions and findings will be drawn for the total sample, then the individual AFSCs and curriculum effectiveness.

The results of Jones' study and this one will be compared drawing additional conclusions and findings. Finally, the research hypothesis conclusions are given.

Test Results

A summary of all significant data is listed in Table 20.

	CCAF REGISTERED		ADVANCED STATUS		CCAF DEGREE	
AFSC	CHI-SQR	CONT COEF	CHI-SQR	CONT COEF	CHI-SQR	CONT COEF
32XXX	*		*			
41XXX	XXXX	XXXX	*	*	XXXX	XXXX
46XXX	*		*		+	
47XXX			XXXX	XXXX	XXXX	XXXX
49XXX	*	*	+		+	
64XXX	*	*	*	*	*	*
70XXX	*		*	*	*	
81XXX	*		*	*	*	*
90XXX	*	*	*	*	*	
98XXX	XXXX	XXXX				
Total	*		*		*	

*-Significant at .01 level or .20 contingency coefficient and higher
+-Significant at .05 level
XXXX-No test results due to small cell size

Table 20. Summary of All Test Results

Total Sample.

Conclusion 1. There is a significant (.01 level) positive association between CCAF participation and early promotion to master sergeant. However, this relationship is not strong enough (.20 contingency coefficient) to be generalized to all five CCAF general program curriculum areas.

Finding 1. CCAF Registered and Advanced Status demonstrated a relationship with promotion to master sergeant. While not as strong as desired (.19 contingency coefficient), it closely approaches desired strength (.20) and may be useful for selected individual AFSCs.

Individual AFSCs.

Conclusion 2. There is a significant association and strong relationship between early promotion to master sergeant and CCAF registration for the 49XXX, 64XXX and 90XXX career fields.

Conclusion 3. In the 41XXX, 64XXX, 70XXX, 81XXX and 90XXX career fields, a significant association coupled with a strong practical relationship exists between early promotion to master sergeant and CCAF Advanced Status (more than 45 semester hours completed).

Conclusion 4. In the 64XXX and 81XXX career fields, there is a significant and strong relationship between having a CCAF associate degree and being promoted early to master sergeant.

Curriculum Effectiveness. The following findings are based on the assumption (made in Chapter One) that CCAF participation at any level, when significantly and strongly associated with early promotion to master sergeant, indicates the CCAF curriculum is fulfilling one of its stated goals.

Finding 2. A blanket statement that the CCAF curriculum is fulfilling its stated goals for all general program areas cannot be made due to the lack of strength of the relationship between early promotion to master sergeant and CCAF participation in the total sample.

Finding 3. The curriculum for the 41XXX, 49XXX, 64XXX, 70XXX, 81XXX and 90XXX CCAF degree programs shows no sign of being ineffective.

Finding 4. The curriculum effectiveness of the 47XXX and 98XXX career fields is inconclusive due to the small size of both samples.

Finding 5. The curriculum programs for both the 32XXX and 46XXX career fields may not be effective.

The fifth finding contains the same two AFSCs which Jones examined in his study and are reviewed in detail next.

Study Comparison

To more closely replicate Jones' study, two AFSCs, 32XXX and 46XXX, were duplicated in this study. Table 21 compares the results of the two studies. Note that a direct comparison is possible as exactly the same statistical tests, degree of freedom, levels of probability and strength relationship were used in both studies.

		JONES' STUDY (10:30,34) 1985 TSGTS		THIS STUDY 1986 MSGTS		
AFSC	TEST	CCAF REG	CCAF DEGREE	CCAF REG	ADV STAT	CCAF DEGREE
32XXX	CHI-SQR	26.04 *	3.86	11.19 *	8.01 *	.438
	CONT COEF	.24 *	.09	.15	.13	.03
46XXX	CHI-SQR	39.86 *	14.69 *	9.10 *	7.13 *	5.54
	CONT COEF	.30 *	.19	.16	.14	.13
*-Significant						

Table 21. AFSC Study Comparison

The significance and strength of association are considerably lower in all test results for this study as opposed to Jones' study. What would explain this direct conflict between the two studies? What implication does this have for the assumption used for curriculum effectiveness? The main variable that changed was the rank, master sergeant as opposed to technical sergeant. This could be the key in resolving this conflict. A comparison of the total sample results in Table 22 may also help explain the difference.

	JONES' STUDY (10:29)		THIS STUDY		
TEST	CCAF REG	CCAF DEGREE	CCAF REG	ADV STAT	CCAF DEGREE
CHI-SQR	174.16 *	43.71 *	115.23 *	107.30 *	64.28 *
CONT COEF	.25 *	.13	.19	.19	.14
*-Significant					

Table 22. Total Sample Comparison

The largest discrepancy here is the CCAF Registered results. Jones found CCAF Registered to have both a significant and very strong

relationship. This study found a significant (but much smaller Chi-square statistic) and weaker relationship.

Two possible explanations are offered for this. First, there could be other intervening variables at play. This could contribute to a lower contingency coefficient as well as the lower Chi-square statistic.

Another explanation is that the difference between early and late promotions in relation to CCAF participation is simply less for master sergeants. An examination of the percentages of personnel CCAF Registered, indeed shows this to be the case (see Table 23).

	EARLY	LATE	DIFFERENCE	TOTAL SAMPLE
TSGTS (10:29)	.76	.51	.26	.64
MSGTS	.88	.72	.16	.80

Table 23. Percent CCAF Registered

The difference between early versus late promoted technical sergeants was .26, while this difference shrunk to .16 for master sergeants. This would expain the lower Chi-square statistics. The percentage of the total sample which was registered with CCAF also increased from 64% of all TSgts to 80% of the MSgts. With 80% of the promoted master sergeants being registered in CCAF, the relationship between CCAF and early versus late promotions would indeed be weaker than that for the promoted technical sergeants who only had 64% registered.

When this explanation is applied specifically to the two AFSCs in conflict, we see the same phenomenon in Tables 24 and 25.

	EARLY	LATE	DIFFERENCE	TOTAL SAMPLE
TSGTS (10:30)	.85	.62	.23	.75
MSGTS	.89	.77	.12	.83

Table 24. 32XXX Percent CCAF Registered

	EARLY	LATE	DIFFERENCE	TOTAL SAMPLE
TSGTS (10:34)	.76	.45	.31	.61
MSGTS	.91	.78	.13	.85

Table 25. 46XXX Percent CCAF Registered

Conclusion 5. The association between CCAF registration and early promotion is not as great for master sergeants as for technical sergeants.

With the high percentage of master sergeants participating in CCAF, participation becomes more of a prerequisite for promotion itself and less of a discriminator between early and late promotions. Since senior and chief master sergeants meet promotion boards who place a high value on college education (10:37), the master sergeant may be preparing in advance to meet these boards. Thus, a much greater percentage of master sergeants would participate in CCAF.

Finding 6. CCAF participation may be more strongly associated with promotion to master sergeant and above as opposed to early promotion which seems to be more strongly related to technical sergeants and below.

Finding 7. For master sergeant and above, a better measure of CCAF curriculum effectiveness may be associated with promotion versus non-promotion rather than with early versus late promotion.

Finding 8. Jones' study, which concluded there was a "relationship between CCAF and early promotion," is validated for MSgts in selected AFSCs.

Research Hypothesis

The following outlines the decision to accept or reject the research hypothesis.

The null hypothesis, which states that being promoted early to master sergeant versus late is independent of having participated in a CCAF program, was rejected at the .01 significance level. An association was established both within the total sample and in eight of ten selected AFSCs.

Once a significant association was established, a review of the data confirmed a positive relationship between CCAF participation and early promotion to master sergeant.

Finally, the total sample's strength of relationship was just below that judged to be of practical value. However, it was strong enough in selected AFSCs.

Conclusion 6. The research hypothesis which states that NCOs in selected AFSCs who participated in CCAF are more likely to be promoted early to master sergeant than late is accepted at the .01 significance level with a .20 contingency coefficient.

Summary

This chapter discussed various conclusions and findings concerning first, the test results, then, a comparison between this study and Jones' with an explanation of a conflict in results. Finally, the research hypothesis was accepted. Chapter Six discusses recommendations.

Chapter Six

RECOMMENDATIONS

Although it cannot be specifically concluded that the lack of association between CCAF participation and early promotion in certain AFSCs was caused by curriculum problems, this lack of association can be used as a flagging technique to identify possible weak curriculum areas. In this study, the following career fields were not thus flagged: 41XXX, 49XXX, 64XXX, 70XXX, 81XXX and 90XXX. However, two AFSCs were flagged as possibly requiring a review to evaluate whether the needs of the students and Air Force are being met. Those were in the highly technical 32XXX (Avionics Systems) and 46XXX (Munitions) career fields. The findings for these two AFSCs conflicted with those found in Jones' study. It is proposed that perhaps in certain fields and in the more senior enlisted ranks, there may be a more accurate method of flagging effectiveness of CCAF curriculum. Therefore, a further study is recommended to examine if associating promotion versus nonpromotion with CCAF participation is more accurate than early versus late promotion. This may also better explain the conflict between this study and Jones' in regard to the curriculum effectiveness of the 32XXX and 46XXX career fields.

Another area for future study is to examine other intervening variables that are associated with both CCAF participation and early promotion and the role they play. For example, if reading comprehension was one of these variables, then more emphasis could be attached to this in the curriculum to improve promotion potential and usefulness to the Air Force. It may be found that CCAF has more of an impact when technical expertise has a greater influence on promotion.

Also recommended is a study on why certain AFSCs, for example, the 64XXX Supply career field, had such a strong association between early promotion and CCAF participation while others, such as the 32XXX Avionics career field, had a weak association.

Another recommended area for further study is the use of Advanced Status as opposed to CCAF Registered as a more useful indicator for senior master sergeant promotion and above. It would seem that the Advanced Status and even CCAF Degree groupings would become more important to the promotion of senior enlisted personnel.

Finally, recommend CCAF publicize the results of both studies to show that in selected AFSCs, CCAF participation and early promotion are strongly related.

BIBLIOGRAPHY

A. REFERENCES CITED

Books

1. Ferguson, George A. Statistical Analysis in Psychology and Education. New York: McGraw-Hill Book Company, 1966.

2. Mendenhall, William. Introduction to Probability and Statistics. Boston: Duxbury Press, 1983.

3. Richmond, Samuel B. Statistical Analysis. New York: The Ronald Press Company, 1964.

4. Snedecor, George W. and William G. Cochran. Statistical Methods. Ames, Iowa: The Iowa State University Press, 1968.

5. Williams, Frederick. Reasoning with Statistics. New York: Holt, Rinehart and Winston, Inc., 1968.

6. Wonnacott, Thomas H. and Ronald J. Wonnacott. Introductory Statistics for Business and Economics. Santa Barbara, California: John Wiley and Sons, 1977.

Official Documents

7. Air Command and Staff College. Research Handbook. Maxwell AFB, AL, Undated.

8. US Department of the Air Force. Atlas Inquiry Language. Programmed Learning Text Book One Instructional Guidance. Randolph AFB, TX: Data Systems Training AFMPC/MPC Det., 1 June 1983.

9. US Department of the Air Force. Community College of the Air Force General Catalog. No. 9, Washington, DC: Government Printing Office, 1984-1986.

CONTINUED

Unpublished Materials

10. Jones, Donny R., Maj, USAF. "Preparing Today's Maintenance NCO to be a SNCO in the 1990s." Research study prepared at the Air Command and Staff College, Air University, Maxwell AFB, AL, April 1986.

Other Sources

11. Southern Association of Colleges and Schools. "Criteria for Accreditation, Commission on Colleges." Pamphlet of rules approved by the College Delegate Assembly, Atlanta, Georgia. December 1984.

B. RELATED SOURCES

Books

Arkin, Herbert and Raymond R. Coulton. An Outline of Statistical Methods. New York: Barnes And Noble, Inc., 1946.

Official Documents

US Department of the Air Force. Addendum to the Community College of the Air Force General Catalog 1984-1986. Washington DC: Government Printing Office, 1 November 1985.

US Department of the Air Force. Air Force Regulation 39-1: Airman Classification. Washington DC: Government Printing Office, 1 January 1982.